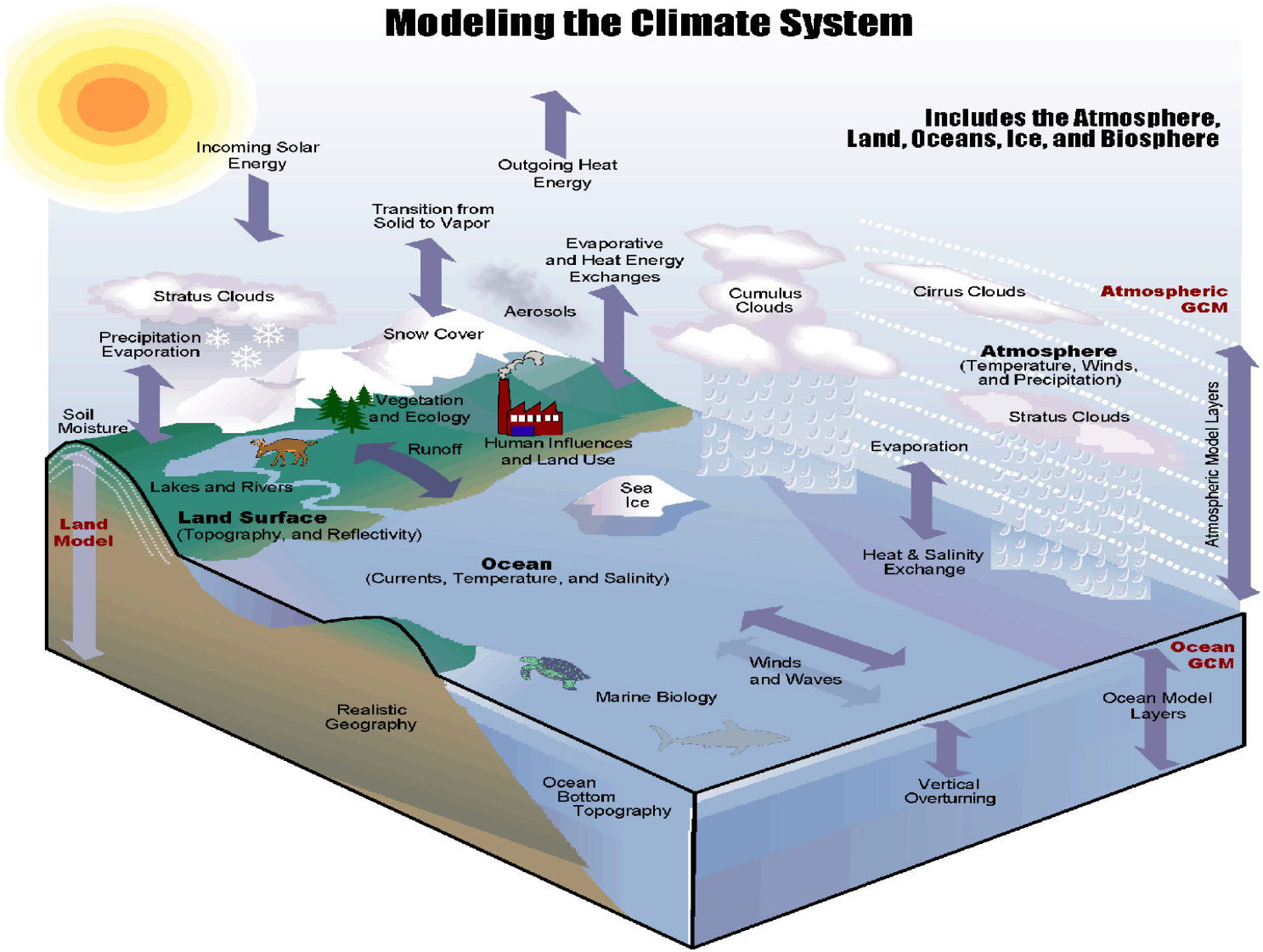
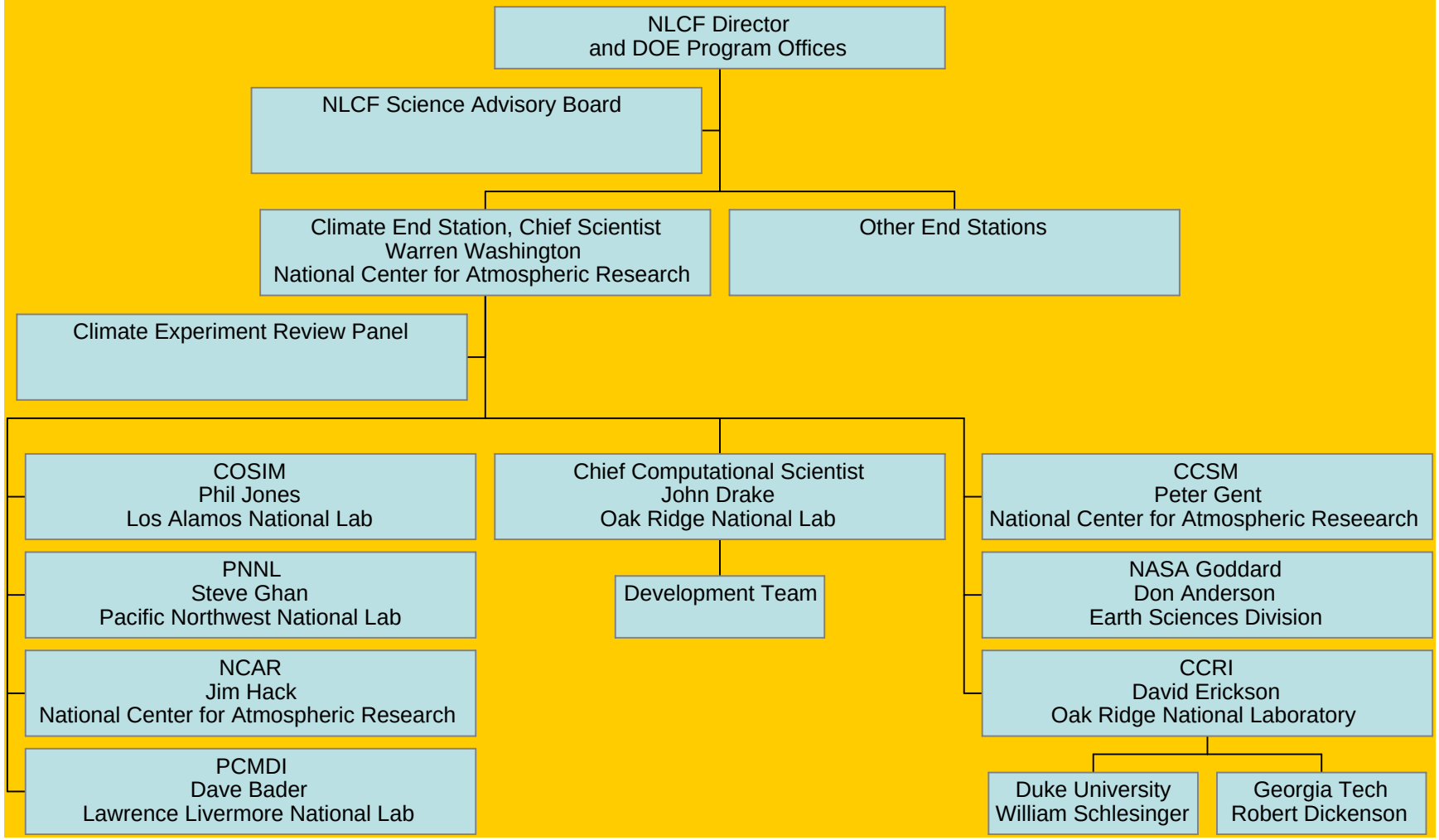
Climate-Science Computational End Station

Lawrence Buja NCAR/CGD



Organization of the Climate Science End Station



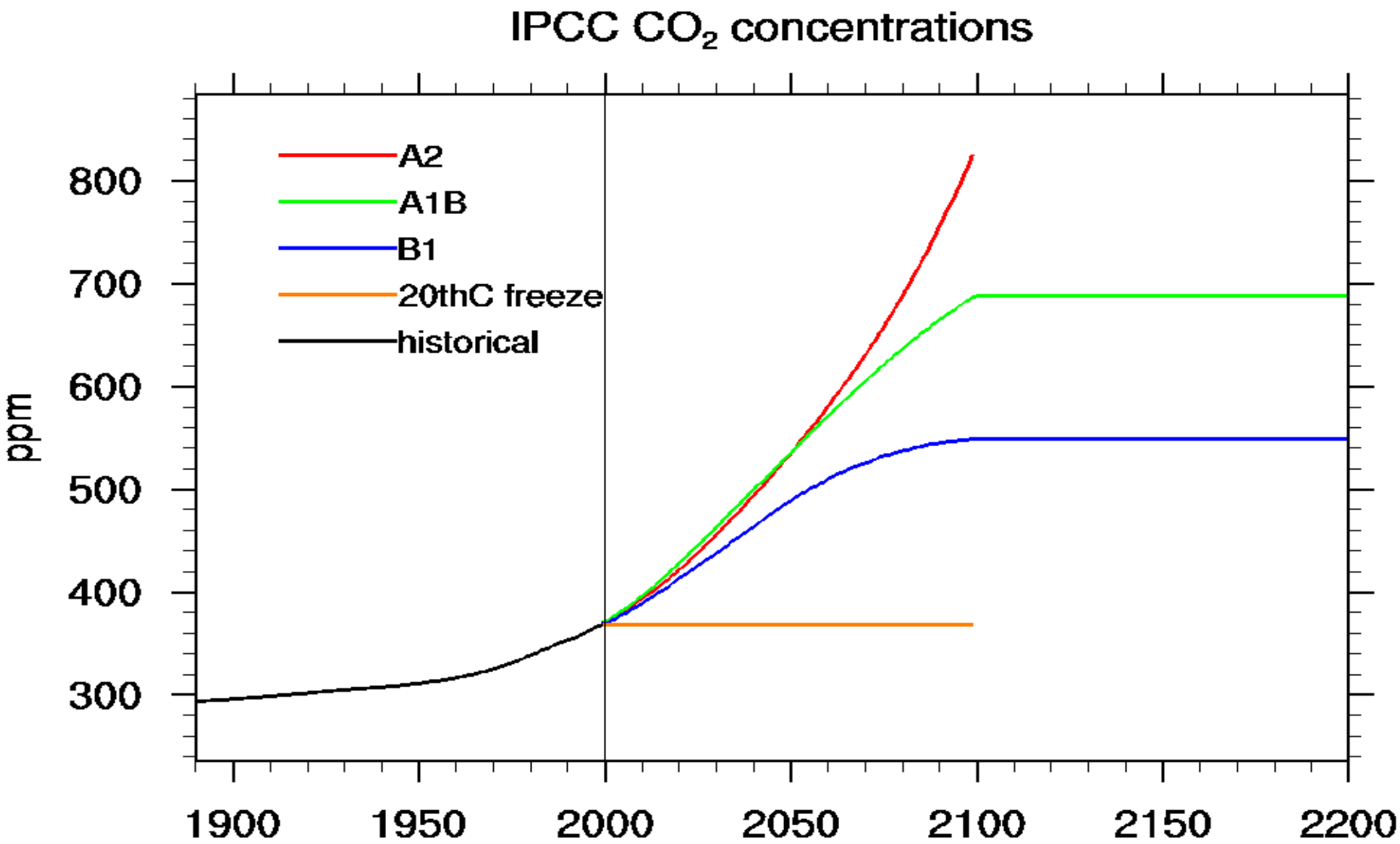
Climate End Station Goals

DOE/NSF partnership to understand and predict the Earth's Climate System

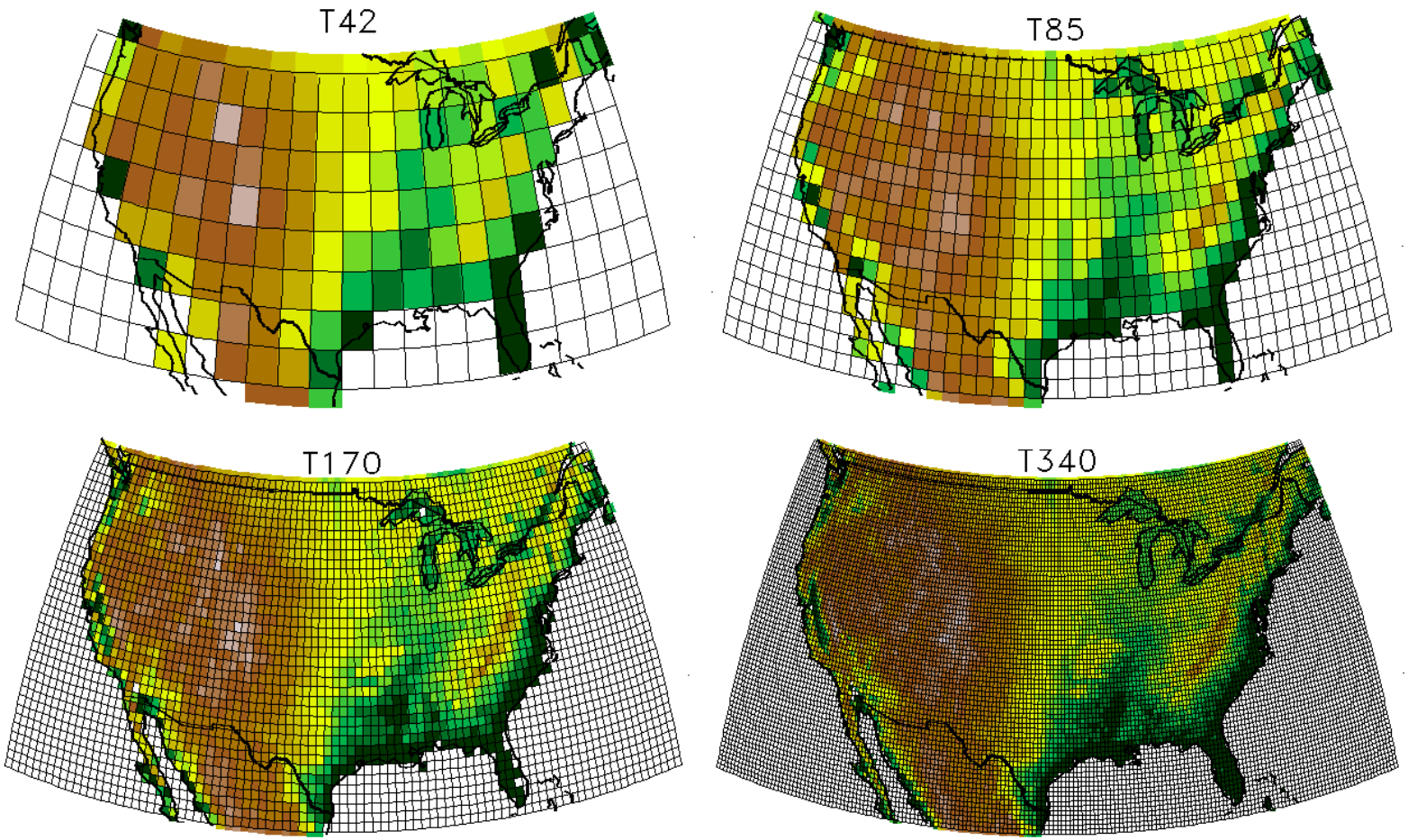
1. Simulate the dynamic ecological and chemical evolution the climate system.
   - Biogeochemical feedbacks in the global climate system,
   - Document, understand and correct the "biases" or systematic errors
   - Understand internal variability and abrupt transitions of the climate system
   - Focus on processes having an impact on the global carbon cycle.

2. Deliver a next-generation climate model in three years.
   - Integrate Biogeochemistry, Dynamic Vegetation, Atm Chemistry, New Dynamical Core
   - Input emissions of carbon dioxide and other greenhouse gases.

3. Develop, and support the CCSM for use in climate simulation experiments.
   - Capability tools & simulation frameworks to advance climate-change science
   - High-priority simulations that require NLCF high-end modeling capability
   - Outreach through simulations, analysis of model results and workshops.


IPCC CO_2 concentrations
A2
A1B
B1
20thC freeze
historical
ppm
800
700
600
500
400
300
1900
1950
2000
2050
2100
2150
2200

NCCS Enabling Breakthroughs



Climate End Station Subprojects

Project	Partner	Leads
CCSM Development	NCAR/ORNL/LANL	Gent/Drake/Vertenstein
High Resolution Ocean	COSIM/LANL	Jones
High Resolution Atmos	NCAR	Hack
Biogeochemistry	ORNL/NCAR	Hoffman/Mahowald
Climate Change & Prediction	NCAR	Buja
Regional Downscaling	PNNL	Ghan
Data Analysis	PCMDI	Bader
Data Assimilation	NASA/ORNL	Anderson
University Collaborations	ORNL/Duke/GeorgiaTech	Erickson

FY06 Milestones

High resolution ocean and sea ice , POP2 and CICE
High resolution atmosphere model bias studies,
Biogeochemical intercomparison simulations from C4MIP
Climate Change scenarios stabilization with CCSM3.0 at T85,

FY07 Milestones

Bias studies with high resolution atmosphere/ocean coupling,
Dynamic ecosystem feedback simulation,
High res ocean THC and deep water formation,

FY08 Milestones

Fully coupled physical climate at high resolution
Chemical coupling of climate and ecosystems
Climate sensitivity of high resolution coupled model.

Biogeochemistry Intercomparison

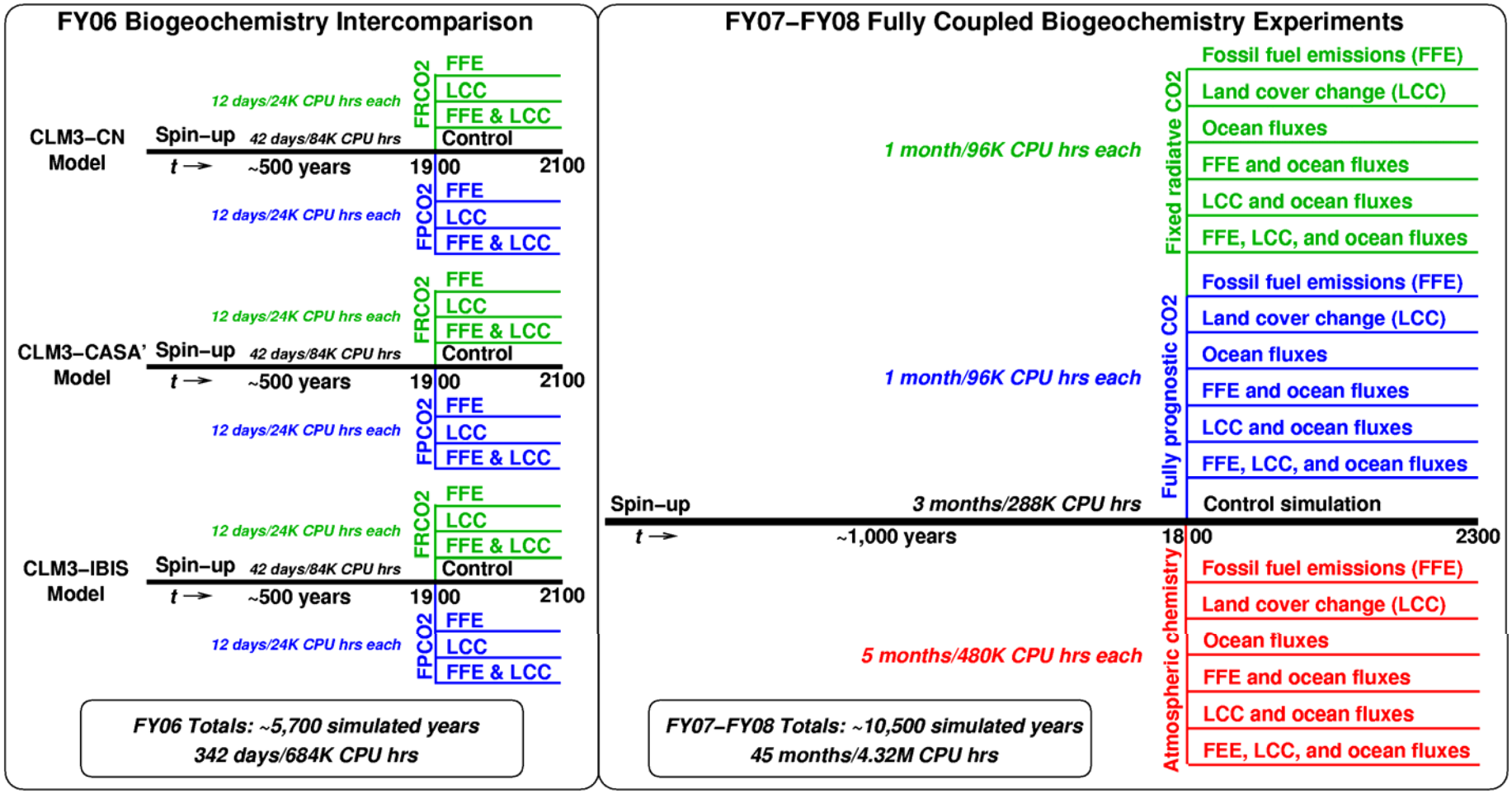


Figure 1: Proposed biogeochemistry Intercomparison and fully coupled biogeochemical climate simulations, scoped on the Cray X1E but may move to the Cray XT3.

Expectations of CES Projects

1. Science/operation plans with well-defined milestones
   - Science proposal: Science goals and approach, computational requirements, output data description
   - Operations plan: Project timeline, milestones, and deliverables; support personnel, NCCS resources, risks
   - Defined sub-allocations with 33% and 66% use targets

2. Efficient use of resources…tuning to a sweet spot
   - Document computational efficiency of their code in proposal
   - Work with CES support staff to address any issues

3. Yearly accomplishments reports
   - Progress meeting science/operational milestones,
   - Lists of publications that used and credited DOE resources.
   - Factor for continuation of projects

4. Project media for DOE Program Managers
   - Compelling images/animations to help PM's support us.

Climate End Station Timeline